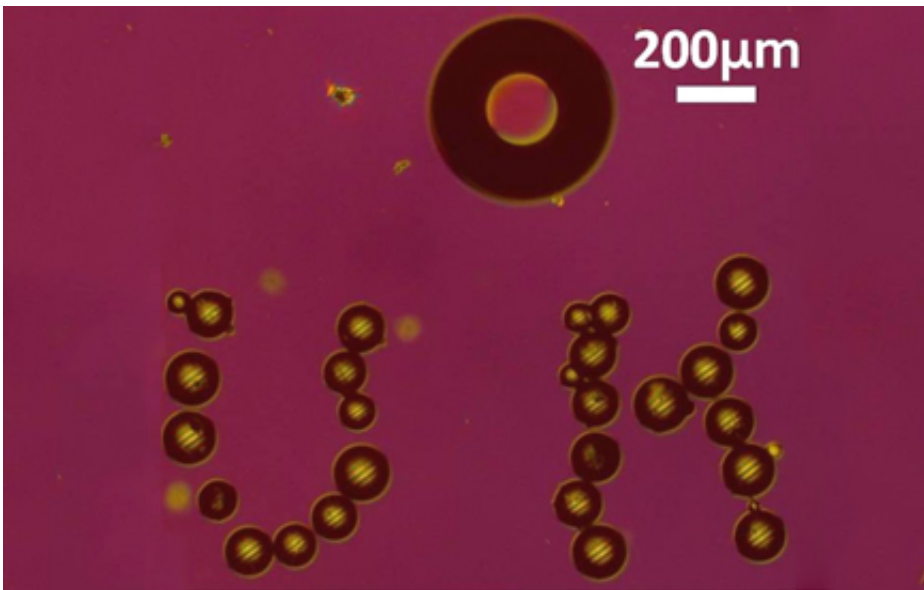


Hawaii lab turns laser-powered bubbles into microrobots

May 23 2012, by Nancy Owano



(Phys.org) -- A team of scientists from the University of Hawaii are working on microrobots created from bubbles of air in a saline solution. The bubbles take on their title of “robots” as a laser is deployed to work as an engine to power the bubbles’ directions and speed. The microrobots follow the positions of the projected light; multiple microrobots can be controlled at once. Among the demonstrations is an example of how bubble microrobots can pass around glass microbeads. Using a fine-tipped syringe filled with air and saline solution, the scientists went to work on making these robots out of bubbles.

Their setup included a 400 mW infrared laser to propel the [bubbles](#). Light patterns were in control of the microrobots' movements. The laser, shone through the bubble, heats the far side; the bubble solution tries to shift away from the heated side toward the cooler side. This fluid flow pushes the bubble towards the hot area. An array of infrared lasers can steer the bots for a finely tuned manipulation at small levels.

Moving the laser to different sides of the bubble affords complete 360 degree steering. The velocity of the bubble is proportional to the intensity of the [laser](#), and the process can go slow or fast.

The team responsible for this work, from the University of Hawaii at Manoa, presented their study last week at the IEEE International Conference on Robotics and Automation in St. Paul, Minnesota. Wenqi Hu, Kelly S. Ishii, and Aaron T. Ohta from the university's Department of Electrical Engineering, presented "Cooperative Micromanipulation Using Optically Controlled Bubble [Microrobots](#)."

Next steps for the researchers will be to explore how the bubbles can be used in teams to transport and assemble microbubbles into complex shapes. They aim for a system that can provide autonomous control realtime, based on visual feedback.

IEEE Spectrum, commenting on their work, says a result of their explorations may be having swarms of microscopic bubble robots conjured out of nothing and set to work building microstructures with an array of thermal lasers, and "then when they're finished, give each one a little pop to wipe it completely out of existence without any mess or fuss."

More information: www-ee.eng.hawaii.edu/~aohta/research.html

via [IEEE](#)

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